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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/528,889	03/20/2000	Gregory N. Hullender	1204	5627

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EXAMINER
MILLER, MARTIN E

ART UNIT	PAPER NUMBER
2623	

DATE MAILED: 11/23/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/528,889	HULLENDER ET AL.	
	Examiner	Art Unit	
	Martin E Miller	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *amendment filed 9-20-2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Arguments

1. Applicant's arguments presented with respect to the examiner's 35 U.S.C. §112, first and second paragraph rejects are found to be persuasive; therefore, the §112, first paragraph rejections of claims 1-18 are withdrawn as are the §112, second paragraph rejections of claims 5, 6, and 11.

2. With respect to the arguments regarding the Crane reference (US 4718102), the examiner finds them persuasive; therefore, the examiner withdraws his 35 U.S.C. §103(a) rejections of claims 1-18.

3. Applicant argues, "the secondary recognizers determination is not bound by any earlier decision of the primary recognizers" (pg. 12 of arguments submitted Sept. 20, 2001). The applicant goes on to state that the secondary recognizers of Crane as applied in the previous office action had depended upon a confusion set (pg. 13 of arguments submitted Sept. 20, 2001). The examiner agrees that Crane does not apply because of the reasons stated by the applicant. But the applicant seems to be missing the point of why the secondary recognizers are being used in the prior art and in the applicant's invention. The secondary recognizers are used when the primary recognizer is confronted with a character that is typically easily confused with another or several other characters (see specification at pg. 6, ll. 10-15, pg. 9, ll. 20-25, pg. 12, ll. 18-20, all of pg. 13, and figure 4). So although applicant argues that the secondary recognizers may be able to output any character, the specification does not support such an argument. Applicant is respectfully requested to point out the specific pages and line numbers of the specification that support his arguments. Alternatively, the claims do not state such feature and the examiner does

not interpret the word "independent" to include any further implications beyond its plain meaning.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claims 1, 2, 7, 8, and 12 are rejected under 35 U.S.C. 102(a) as being anticipated by Pintsov, US 5,881,172.

As per claim 1, Pintsov teaches:

providing a primary recognizer (universal classifier system, abstract, col. 2, ll. 7-34, col. 20, ll. 28-54) for converting chirographs (col. 2, l. 21, "styles of handwriting" and col. 2, ll. 34-35) to shape indexes; applicant states in his arguments that the out put of the primary recognizer could be "in the form of a shape index , such as a code point" (pg. 11 of amendment entered into the file September 20, 2001), Pintsov's universal classifier outputs "machine-readable data, typically in ASCII form', col. 1, ll. 47-49. Pintsov goes on to state that the "character may be recognized by the universal classifier", the recognition result inherently being in the form of a shape index classification or code point.

providing a plurality of secondary recognizers ("specialist classifiers", col. 3, ll. 16-18) to convert chirographs into code points (col. 4, ll. 10-14), and associating the secondary recognizers with at least some of the shape indexes ("ambiguity classes", col. 3, ll. 18-21),

receiving a chirograph (col. 1, ll. 10-11, "automated recognition of ...handwritten characters").

providing a chirograph to a primary recognizer and receiving a shape index therefrom (col. 3, ll. 55-60, "character candidate", Pintsov goes on to state that the "character may be recognized by the universal classifier", the recognition result inherently being in the form of a shape index classification or code point.).

determining whether one of the secondary recognizers is associated with the shape index ("Any particular specialist classifier is selected based upon the probable identity of a candidate character...and whether the candidate character is 'suspicious'".), and if so, selecting that secondary recognizer as a selected secondary recognizer; and

passing the chirograph (image data, col. 3, l. 61) to the selected secondary recognizer, the secondary recognizer returning a code point from the secondary recognizer, the code point returned by the secondary recognizer determined independent of the output of the primary recognizer. The specialist classifier of Pintsov is trained on a large set of characters that belong to the specific ambiguity class. Pintsov does not teach, other than using the recognition result of the universal classifier (primary recognizer) to *select* the specialist classifier (secondary recognizer), that the specialist classifier depends upon the universal classifier for any additional input. Based upon the disclosure (see specification at pg. 6, ll. 10-15, pg. 9, ll. 20-25, pg. 12, ll. 18-20, all of pg. 13, and figure 4), Pintsov's system is exactly the type of system that the applicant is trying to implement.

As per claim 7, it recites substantially the same limitations as claim 1 above except only broader and analogous remarks apply.

As per claims 2, and 8, they recite identical limitations and, therefore, the following remarks apply to each.

Pintsov teaches:

shape index comprises a code point (the output of the universal classifier is a "machine-readable data, typically in ASCII form', col. 1, ll. 47-49, or col. 3, ll. 55-60, "character candidate", Pintsov goes on to state that the "character may be recognized by the universal classifier". By recognizing the character, which he teaches is usually output in ASCII form, it inherently follows that the value passed to the specialist recognizer would also be in ASCII form.).

As per claim 12, Pintov teaches:

wherein the recognition result comprises a code point. (col. 1, ll. 47-48).

Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 13-15, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pintsov as applied to claims 1 and 7, further in view of Crane, US 4,531,231.

As per claim 13, it recites substantially the same limitations as claim 1 above except only broader and analogous remarks apply. Claim 13 does have one different limitation that requires further explanation. Pintsov teaches that his recognition system can be used for automated recognition of handwritten characters (col. 1, ll. 10-11), but he does not specifically state an interface means for accepting a handwritten character data. Pintsov teaches accepting image data

from some device (see figure 4, element 3). The claim recites that the use of an "interface configured to receive a chirograph", Crane teaches an interface (see figs. 1 elements 12 and 14).

It would have been obvious to one of ordinary skill in the art to utilize the handwriting input means of Crane in the system of Pintsov to provide a registration means so that Pintsov could accept handwritten characters so that Pintsov could utilize his method of automated handwriting recognition. Additionally, the Crane reference is used to illustrate that such an interface feature is well-known in the art of computer-based handwriting recognition.

As per claim14, Pintsov teaches:

shape index comprises a single code point (the output of the universal classifier is a "machine-readable data, typically in ASCII form', col. 1, ll. 47-49 or col. 3, ll. 55-60, "character candidate", Pintsov goes on to state that the "character may be recognized by the universal classifier". By recognizing the character, which he teaches is usually output in ASCII form, it inherently follows that the value passed to the specialist recognizer would also be in ASCII form.).

As per claim 15, Pintsov teaches:

wherein the shape index comprises a single code point that differs from the returned code point (col. 4, ll. 15-23, Pintsov states, "Note that the character determined by the selected specialist classifier may be the same character determined as being most probable by the universal classifier system"(emphasis added). This statement indicates that the code point returned my differ from the code point provided to the specialist classifier.

As per claims 17, they recite generally the same limitation as claim 15 except more broadly and analogous remarks apply.

8. Claims 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pintsov and Crane as applied to claim13 above, and further in view of Guo et al. (Guo), "Classification trees with neural network feature extraction", Proceedings IEEE Computer Society Conference on Computer Vision and Pattern Recognition, June 1992.

As per claim 18, Pintsov does not teach a specific means to accept a chirograph, however, Crane teaches:

receiving a chirograph (figure 1, elements 12 and 14). Although Crane teaches providing the shape information to a character set discriminator (figure 1, element 16), the examiner is relying upon the teachings of Pintsov to teach the recognition method.

Pintsov teaches:

providing the chirograph (image data, figure 4, element 3) to a primary recognizer (universal recognizer, figure 4, element 8) and receiving recognition information therefrom a primary recognizer for converting chirographs to code points (col. 1, ll. 47-49).

determining whether the recognition information corresponds to a recognized result (col.. 4, ll. 11-23) or has a value indicative [of a specialist classifier]. Pintsov teaches that the specialist classifier can be selected based upon any desired criteria including "assignment of a character candidate to by the universal classifier system to a predefined characters groups known to be ambiguous", col. 3, ll. 50-60). The examiner is interpreting this portion of the disclosure to mean that the universal recognizer assigns a character value to the input data, such as an ASCII value for the number "4", his system, then looks at the predefined characters that are part of an ambiguity set, which includes "4" due to its resemblance to "9". Therefore, Pintsov teaches that the specialist recognizer is selected based upon the value returned from the universal classifier.

Pintsov does not specifically teach the use of CART trees as specialist classifiers. Pintsov does, however, teach that the "specialist classifiers may be implemented in any desired fashion using...algorithms known in the art of character recognition" (col. 3, ll. 26-31). Guo teaches a recognition algorithm that is known in the art.

Guo teaches Cart trees are used to solve difficult pattern recognition problems with complex decision or human judgment boundaries (col. 2, second paragraph, p. 183). Guo also teaches that a decision rule is associated with a tree col. 1, second paragraph, p. 184

Pintsov teaches the structure of the following claims and Guo teaches the use of a CART tree:

determining whether the recognition information corresponds to a recognized result or has a value indicative of a CART tree being associated therewith (Pintsov, col. 3, ll. 50-60, Guo, section 4.2);

if the recognition information corresponds to a recognized result, and if the recognition information has the value indicative of the CART tree being associated therewith, providing chirograph information to the CART tree and returning a recognition result therefrom, the recognition being independent of the value indicative of the CART tree. (Pintsov, col. 4, ll. 4-22, Guo, section 4.2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to integrate methodology of the CART algorithm with respect to handwriting as taught by Guo as a result of the optimization of the splitting criterion and the use of the Gini criterion as a specialist classifier in the system of Pintsov to bring the full power of the CART algorithm as taught by GUO to bear on the specific ambiguity class to provide a more accurate result.

As per claim 16, it simply recites the use of a CART tree as a secondary recognizer and the remarks in rejecting claim 18 above apply to those claims.

9. Claims 3-6 and 9 –11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pintsov and Crane as applied to claim13 above, and further in view of Guo et al. (Guo), "Classification trees with neural network feature extraction", Proceedings IEEE Computer Society Conference on Computer Vision and Pattern Recognition, June 1992.

As per claims 3 and 9, Pintsov teaches the "specialist classifiers may be implemented in any desired fashion using...algorithms known in the art of character recognition" (col. 3, ll. 26-31). Guo teaches a recognition algorithm that is known in the art.

Guo teaches:

wherein the secondary recognizer is a CART tree. (section 4.2)

It would have been obvious to one of ordinary skill in the art at the time of the invention to integrate methodology of the CART algorithm with respect to handwriting as taught by Guo as a result of the optimization of the splitting criterion and the use of the Gini criterion as a specialist classifier in the system of Pintsov to bring the full power of the CART algorithm as taught by GUO to bear on the specific ambiguity class to provide a more accurate result.

As per claim 4 and 10, Guo teaches:

training the secondary recognizers by providing a first training set comprising a plurality of chirographs and actual code points for each chirograph (p. 185, sect. 3.1, second paragraph). Guo states that the pattern vectors (actual code points) and their class labels (chirograph) are at a given node. Further in section 4.2 he states that the handwritten character is encoded into pattern vectors.

As per claims 5 and 11, Guo teaches:

wherein training the secondary recognizers further comprises determining a plurality of distinguishing features of the chirographs based on predetermined criteria. Guo teaches that CART trees are grown by recursively finding splitting rules until it cannot be split further (p. 184, sect. 2.1 TREE GROWING. He further teaches in his introduction section, p. 183, that trees classify an input pattern through a chain of decisions. Typically decisions when flow charted are presented in the form of a question (e.g., Does value x exceed threshold b?).

As per claim 6, Guo teaches:

wherein the predetermined criteria correspond to questions, and wherein training the secondary recognizers further comprises determining a question ordering by measuring the quality of each question. (p. 185, sect. 3.1 TREE GROWING, last paragraph of col. 1 and first part of col. 2.) Guo teaches that two different criteria are optimized to find a "good split", it is obvious in the use of CART trees that a quality question would result in a "good split".

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following also teaches a preliminary recognition then a follow on recognition: Shimizu et al., US 6038343 and Guberman et al., US 5467407

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin E Miller whose telephone number is 703-306-9134. The examiner can normally be reached on Monday-Friday, 9 am- 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 730-308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

MEM
mem
November 18, 2001

AMELIA M. AU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600